



# PORT MARIANNE WOOD COMBUSTION TRIGENERATION

BIOMASS HEAT, COOLING, AND ELECTRICITY PRODUCTION FOR CITY BLOCKS FEATURING FUNCTIONAL DIVERSITY (HOUSING, COMMERCE, ACTIVITIES, EQUIPMENT).

*The 9<sup>th</sup> plant in the Montpellier network, this site produces three types of energy from wood: renewable heat, cold, and electricity. In the long-term, the plant will supply 6 districts.*

*Unique in France and Europe in terms of size, this equipment offers:*

- Centralized production of hot water and electricity
- Decentralized production of cooling, using water absorption machines installed in buildings.

*The plant uses wood from the nearby Haut Cantons area, and Class A salvaged wood from within 120 kms.*

*The project's relevance is also based on its application to city blocks offering functional and program diversity, featuring housing, commerce, activities, and equipment. This diversity makes it possible to imagine practical pooling of resources for energy production and consumption, based on the city's time-frames for a given use: home time is different from office time, which is also not the same as business time.*

*The principle of trigeneration makes it possible to meet the varying needs of users in real-time.*

*Installed since April 2015*

## INNOVATIONS

The project integrates several innovations:

- ▶ Wood-based electricity production at this large of urban scale
- ▶ Cooling production from wood-based renewable energy
- ▶ Priority on heat production (1<sup>st</sup> thermal cogeneration in France)
- ▶ All year round simultaneous production of renewable electricity, heating, and cooling.

The startup ENERTIME developed the ORCHID 1 MW Organic Rankine Cycle module, which transforms heat into electricity and operates like an inverted heat pump. This technology is

particularly well suited for producing electricity from low temperature heat sources (< 300°C).

## KEY FIGURES

- With a capacity of 8 thermal MW to cover 80% of needs for heating, the plant provides 100% green electricity production using a 500 KWe turbine powered by renewable heating.
- 6,200 tons of carbon are saved annually (compared to a natural gas based solution).
- 5,200 apartments, 300,000 sq meters of offices, businesses, and public infrastructure are supplied.

## STAKEHOLDERS

An initiative of the City of Montpellier, in partnership with SERM, Montpellier Méditerranée Métropole, the French government, Caisse des Dépôts, and ADEME

- **Licensor:** City of Montpellier
- **Project owner/Concessionaire:** SERM



- **Architect:** Imagine
- **Main project manager:** SETEC environnement
- **Network project manager:** ALTERGIS
- **Companies:**
  - Technical controller: APAVE
  - SPS coordinator: Qualiconsult
  - Roads, networks, and outdoor spaces: GUINTOLI
  - Main structure and interiors: DUMEZ SUD
  - Wood process: WEISS France
  - ORC: ENERTIME
  - Climatic engineering: SPIE SUD OUEST
  - High-voltage electricity: CEGELEC
  - Automation – CTM: REYES INDUSTRIE
  - Heating network: SOGEA SUD
  - Wood supplier: EUROPEENNE DE BIOMASSE
  - Operation and maintenance: IDEX

## RESULTS

- /// Cogeneration yield: 84%
- /// Renewable heating over 90% all year round.
- /// Heat production globally without carbon impact (low impact balanced by electricity produced).
- /// 6,200 tons in annual carbon savings.
- /// Ample wood resources within 120-150 kms of Montpellier.

**The trigeneration plant is EcoCité certified.**  
**It is recognized as innovative by the Derbi Competitiveness Cluster.**



## FINANCIAL ASPECTS OF THE OPERATION

- PIA – City of Tomorrow – Wood trigeneration: 4,962 K€
- Ademe – heating fund: 2,674 K€
- Total subsidies: 7,636 K€
- SERM: 13,740 K€

### PROJECT COSTS

- Wood cogeneration: 9,350 K€
- Heating network and exchange substations: 5,230 K€
- Cooling production by absorption: 6,526 K€
- Total project costs: 21,106 K€

/// Investment of €19,200,000.

/// Benefited from co-funding from the EcoCité Fund for the City of Tomorrow, €4,962,000 - supported by France's "City of Tomorrow" Investments in the Future program (PIA).

